

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

**SUBJECT:** Site Visit to Anne Arundel County  
Proposed Project XL Bioreactor Landfill

**DATE:** 10/25/02

**FROM:** Steven J. Donohue, Environmental Scientist/Project Manager *SVJ*  
Office of Environmental Innovation (3EI00)

**TO:** Project XL Bioreactor Landfill Team

On October 23, 2002 representatives of EPA, the Maryland Department of the Environment (MDE) and Anne Arundel County (County) met at the County's Millersville Landfill (Landfill) for a site visit and tour. Under the terms of a Project XL Final Project Agreement, the County has proposed to operate an approximately 3/4 acre (160 by 200 foot) portion of Subcell 8-4 at the Landfill as a bioreactor. The following people were present for the meeting and tour: County representatives; Bob DeMarco, Disposal and Maintenance Manager and Ray Riggins, Landfill Manager, EPA representatives; Steven Donohue, Chris Menen and Muke Giuranna from the Regional Office, Chad Carbone Office of Policy, Economics and Innovation and Dwight Hlustick Office of Solid Waste, MDE representatives; Edward Dexter, Ed Carlson and Andrew Grenzer, Solid Waste. A copy of the sign in sheet is attached.

Bob DeMarco gave a presentation on the history and operation of County owned and operated landfill with information on recycling activities, the projected life of the Landfill, waste containment, leachate, storm water and landfill gas management, recent air inspections and groundwater issues. A copy of the Powerpoint briefing overheads is attached. This is the only landfill operating in the County. The County manages approximately 320,600 tons of waste per year. Approximately 75% of this total is exported for disposal outside the County. The remaining 25% is sent to County Landfill. The County is engaged in many efforts to reduce the volume of waste and increase recycling as a means to extend the life of the Landfill. The County has an approximately 30% recycling rate. The County operates three "convenience centers", including one at the landfill, where residents can bring in and drop off, at no cost, a wide variety of materials for recycling including: oil, anti-freeze, lead-acid, appliances, metal, wood, cardboard and yard waste. During our visit, County residents were observed hauling in recyclables for drop off into rolloff boxes designated for the different recycling commodities. County residents pay an annual per household fee for rubbish and recyclable pickup of approximately \$250. Commercial customers pay a per ton tipping fee at the Landfill of \$65 a ton. Demarco stated that if Landfill workers notice significant recyclable materials in commercial customers waste they speak to them to encourage source separation and also may segregate this waste and divert it for recycling before it is landfilled.

Bob Demarco gave his approval to take electronic photos during the tour. Temperature during the Landfill visit was approximately 60 F, winds were light and the atmosphere was clear but hazy. No foul odors were noted during the tour. During the tour I noted improvements were being constructed in the leachate collection tank areas and maintenance was being performed in the landfill gas flare area.. Hydroseeding was being done on portions of Cell 8 where there was no vegetation. The test area of Cell 8 was covered by a thick layer of mulch generated by the shredding of yard and wood waste accepted at the landfill. The side slopes of the landfill were well vegetated primarily with Crown Vetch. The active soil borrow area for the landfill cover was devoid of vegetation. Soil cover of the active face of the landfill is applied one day a week according to MDE regulations. Daily cover is done with a heavy tarp that is over the compacted active face of the Landfill at the end of each day.

The County reported that the combined storage capacity of the two leachate tanks at the Landfill is approximately 600,000 gallons. The County operates a pre-treatment plant for leachate onsite. Leachate is treated in a sequential batch reaction process and then discharged to sanitary sewers for final treatment and disposal at the Pautuxet Publicly Owned Treatment Works. Storm water is managed onsite in detention/retention and infiltration basins. Storm water from the soil borrow area drains to a basin with no outlet. The water is pumped from this area into onsite drainage ditches where flocculent is added and the sediment precipitates out prior to discharge to surface water.

Active Cell 8 is approximately 1400 feet wide and 2500 feet long. The side slopes of Cell 8, where the bioreactor test area is proposed, are 3:1. The test area is on a plateau in the middle of the Cell 8 in an area that is gradually sloping to the southwest. The base of the Cells 8 has a high point that runs down the middle for the length of the Cell. Individual subcells slope at 2% from the middle to the outside of Cell 8 where each is served by a leachate sump. There are double risers extending from the primary leachate collection layer up to the sump stickup areas located at the toe of the side slopes of the landfill. The double risers provide redundant access to the leachate collection layer under each subcell of the landfill. The leachate collection pipe from the stickup to the sump is approximately 200 feet long.

According to the FPA Cell 8-4 contains 95,000 CY of waste and is 80-85 feet deep. For comparison purposes the volume of waste in each of the test areas at the Virginia Bioreactor XL Landfills is approximately 2.2 million cubic yards. Demarco reported the trash in Cell 8-4 from the bottom to the top consists of lifts of: mixed waste of curbside trash, then several lifts of wastes from a "mauler" project the County performed. The top 30 feet consists of curbside trash with greater than 50% construction and demolition waste. The mauler was used to grind the trash into a relatively homogeneous and small particle size that has an increased surface area.

#### Potential Issues Affecting Project XL

DeMarco reported that the County has replaced a total of 14 home wells over the last several years to address the detection of landfill leachate contaminants in area groundwater. The County has replaced these wells when they have the confirmed detection of organic chemical contamination in two consecutive sampling rounds. Cells 1, 2, 3, 4, 5, 6, 7 were constructed before the current solid waste disposal laws and regulation and were not constructed with liners. With the exception of Cell 3, all these Cells were capped. The capping and ground water is being addressed as a result of a 1992 Order that MDE issued to the County. Cell 3 was "mined" by the County i.e. all the waste and underlying soil was excavated and either recycled, disposed of or used as cover in Cell 8. The footprint of Cell 3 is now an infiltration basin. The County has proposed that a monitoring well closer to Cell 8-4 be used as the point of compliance well for the XL Project rather than a more down gradient well where some historic detections of contaminants has occurred.

I noted the presence of the landfill gas (LFG) collection system which was in operation at the landfill. LFG was being collected from wells located on the top of the landfill in Cells 1, 2, 4, 5, 6 and 7. Cell 8 had LFG collection from the sump areas where the leachate collection stickups were located at the toe of the landfill. The LFG was piped to an enclosed flare for combustion. This flare operates continuously, however the County has had two events each of approximately 4 hours each where the blowers that pull a vacuum and collect LFG have been shut down due to a malfunction. As a result of a Region 3 Air Protection Division initiative on large landfills with LFG collection, the County Landfill was inspected by EPA in the spring/summer of 2002. Inspection results will be available at a later date.

### Conclusion

My general impression of the Landfill was that of a clean and well run facility. The MDE representatives concurred with this observation and expressed supported for the XL Project. The Landfill has however, been in operation for a lot longer than the Virginia Project XL Bioreactor Landfills and unlike the Virginia Landfills some old closed and capped Cells at the County Landfill were not lined when they were constructed. Contaminants, presumably leaching from the unlined cells, have been detected in the area groundwater. It is important to note also that the scale of the County Landfill project is an order of magnitude smaller than those being implemented at the Virginia Project XL Landfills.

**US EPA/MDE/ANNE ARUNDEL COUNTY WASTE MANAGEMENT SERVICES  
PROJECT XL BIOREACTOR MEETING  
SIGN-IN SHEET  
October 23, 2002**

<u>Name</u>	<u>Representing</u>	<u>Phone</u>	<u>E-Mail</u>
<u>BOB DEMARCO</u>	<u>A.A.CO.-WMS</u>	<u>410 222-6108</u>	<u>pdemarc01@mail.aacounty.c</u>
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**Anne Arundel County  
Millersville Landfill &  
Resource Recovery Facility**

**Project XL Bioreactor**

October 23, 2002  
EPA Region III/Headquarters  
MDE  
Presentation

Bob  
Ray

**Organization**

- Department of Public Works
  - 800 Employees
  - \$134 M Budget
- Waste Management Services
  - 83 Employees
  - \$43M Operating Budget
  - Enterprise Fund
- Division Units
  - Community Services Program
  - Recycling Program
  - Disposal & Maintenance
- Management Staff - *Jim Pittman*

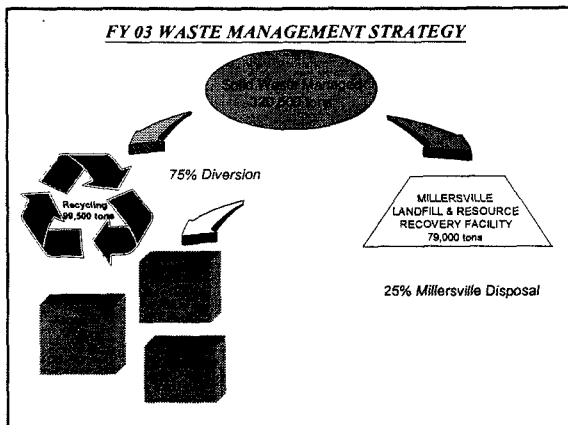
**Background**

- Provide collection, recycling, and disposal services for over 450,000 citizens
- Operate the only sanitary landfill in the County - 2 closed landfills
- Operate 3 homeowner convenience centers
- Offer additional services that include:
  - ✓ Household hazardous waste drop-off
  - ✓ Community clean-up
  - ✓ Curbside bulky item pick-up
- Place high value on preventive maintenance, monitoring, environmental protection, state-of-the-art technology, cleanliness, convenience, efficiency, and customer service

*dedicated Funding To Talk  
on projects.*

*297 - 302 recycling*

*75% diversion of waste - To  
From what they collect  
high C+O waste* *Kris  
George*




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**Millersville Facility**

- 565-acre site
- Accepts no medical, hazardous or industrial waste
- Accepts no waste from outside Anne Arundel County
- 25-30% of waste accepted for disposal at the facility is recycled
  - Brush, tree limbs, yard waste, pallets
  - Metal (including appliances/white goods)
  - Tires
  - Concrete, brick and block
  - Cardboard and mixed paper
  - Cans, bottles and jars

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**Millersville Facility (continued)**

- Extensive environmental systems
  - Waste containment (Subtitle D caps and liners)
  - Liquids management - leachate collection and pretreatment
  - Landfill gas management
  - Sediment and stormwater management
  - Water quality monitoring and protection
  - Cap inspection, maintenance and repair
- Life of current disposal cell: 2020 or longer
- Life of facility: 2065 or longer

*purpose not to defray  
cost or save cost  
of leachate treatment  
pre-treat on site  
WWTP pretux et for treatment*

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#### Waste Containment

- Cells 1 East, 2, 4 and 5-6-7 are closed and capped with geosynthetic membrane
- Cells 1 West and 3 excavated; soils and metal recycled and trash disposed in lined Cell 8
- Cell 8 is active cell; double liner/leachate collection system:
  - Exceeds State and Federal requirements
- Leachate collection is segregated into eight distinct sub-cells
- Perimeter leachate collection sumps, pumps, and over one mile of transmission lines/force mains
- Leachate volume/quality is monitored by individual sub-cell
- Capital Cost to Date: \$41M

permit requirement is  
place new monitoring plan  
accept as issued, all  
GW plans in permit.

#### Liquids Management

- Two 305,000 gallon leachate storage tanks
- Tank area bermed and lined in case of catastrophic release or minor spillage
- Pretreatment plant; ultimate disposal wastewater treatment plant
- Capital Cost: \$3M

#### Sediment and Stormwater Management

- 8 sedimentation basins (unique coffer dam design)
- 5 sediment traps
- Over 3 miles of rip rap swales
- Over a mile of rip rap downchutes
- Over 5 miles of grassed waterway terraces

### Water quality monitoring and protection

- 3 separate ground water zones, monitored
- 53 ground water monitoring wells sampled (Spring/Fall)
- 3 surface water locations sampled (quarterly)
- 11 off site ground water monitoring wells
- 18 off site residential wells monitored
- 14 residential wells replaced exhibiting trace amount (less than 1 ppb) of landfill pollutants (all well below MCL, Health Advisory or GWPS)
- Annual Monitoring Cost: \$160,000
- Residential Well Replacement Cost: \$800,000

*Freon*

*new detection of VOCs in*

*\* TW19 well. Freons from old cell 4*

*3/4 ACRES TEST AREA*

### Landfill Gas Management

- Cells 1E, 2 and 4
  - 22 gas collection/extraction wells
  - 6 horizontal collector trenches
- Cell 5-6-7
  - 75 gas collection/extraction wells
- Cell 8 perimeter gas collection system
- Central Enclosed Flare
  - 3 separate blowers to manage variable flow
- Over 300 million cubic feet of gas collected on an annual basis (99.9% destruction efficiency)
- Capping and Gas System Capital Costs to Date: \$19M
- Beneficial use of landfill gas (planning phase)

*subsurface fire*

*1/4 LY sampling of NSPS*

*1998 requested AOS from MDE*

*3 detections 7500 ppm on cell 8  
in September by EPA*

*• BOS thinks a mulch on cell 8*

*bacteria in  
wastewater entering methane gas*

*Looking for you B+E right of way onsite*

*Looking for using onsite.*

*\* • 1 hr blower shut-off a EPA violation?  
ask Bruce.*

*\$60M invested since 1992 order.*

*order settled in 1998*

### Summary

- Committed to technological excellence
- Model for well-run Subtitle D disposal facility
- Landfill conservation remains key objective
- Respectable compliance record for last 10 years
- Maintain good neighbor policy ensuring safe and clean drinking water
- Evaluate innovative management engineered techniques that coincide with the County's Strategic Plan (e.g., Bioreactor Pilot Project)



His Boss's Title Disposal + maintenance

Ray's last name? + Title Riggins LF manage  
sideslopes 3:1 or 4:1?

double rises on primary lockate collection? yes

stickups go through both sides?

evens on  
north side

lengths?

odds on

when does Flare run? ENCLOSED FLARE runs all the time

describe waste in cell again? C+D 2 malfunction  
#1 - 4 hr

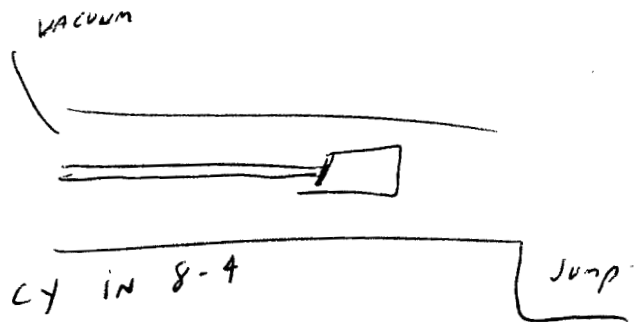
#2 - maybe 3-4

mass of waste in cell 8-4?

mass of water to be added?

2% slope to sump

pipe goes to sump  
200'

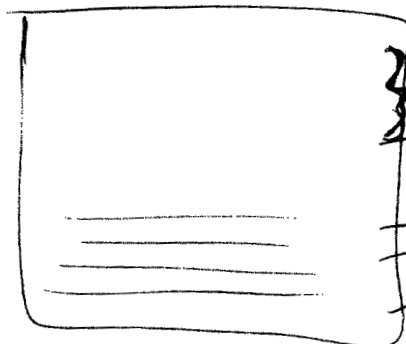


95,000 CY in 8-4

80-85' deep

11/14/02 meeting  
with MAE  
monitoring plan

90'



Tip 30 concrete

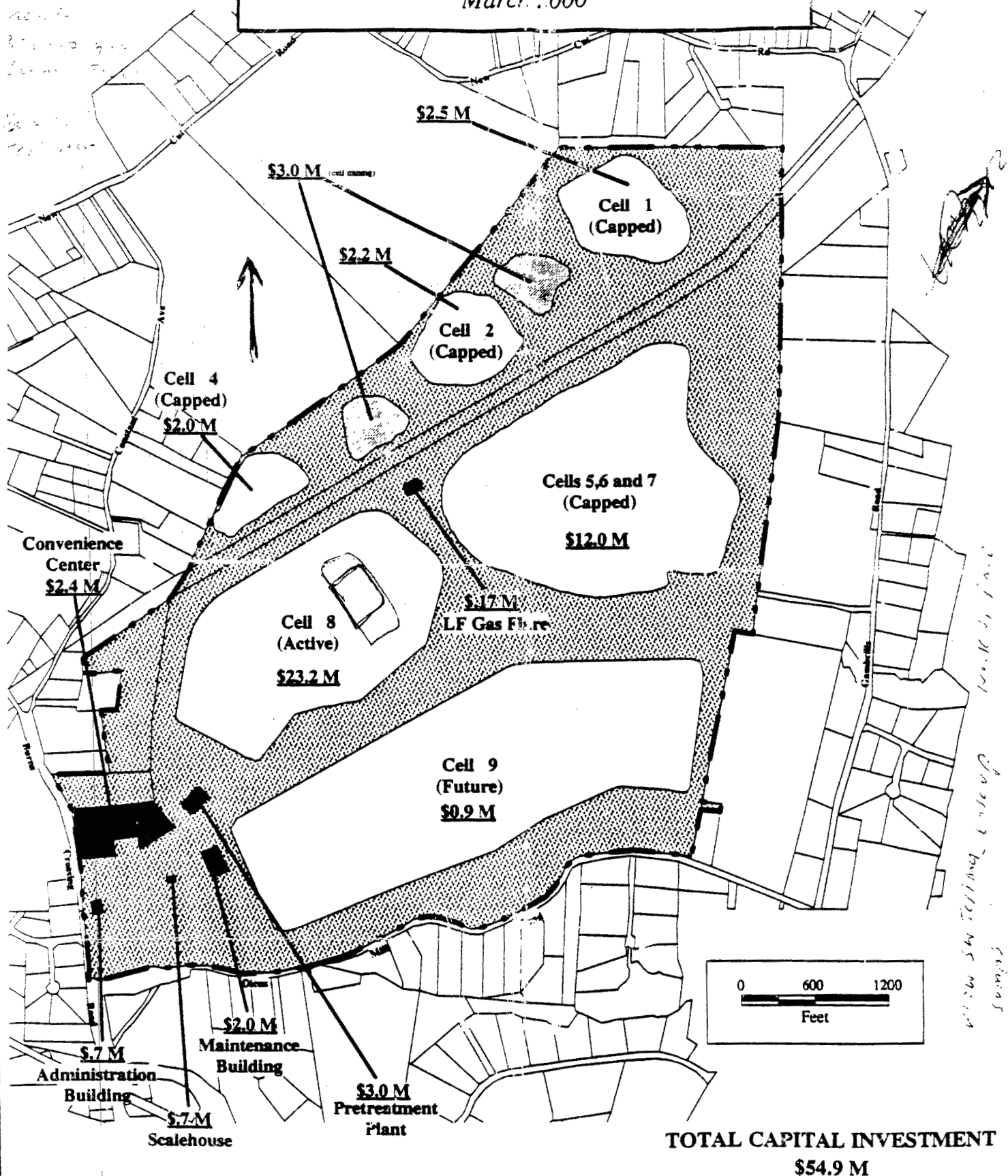
mauler project grinds material homogeneous  
LIFT increase surface

mix "normal waste" LIFT + concrete

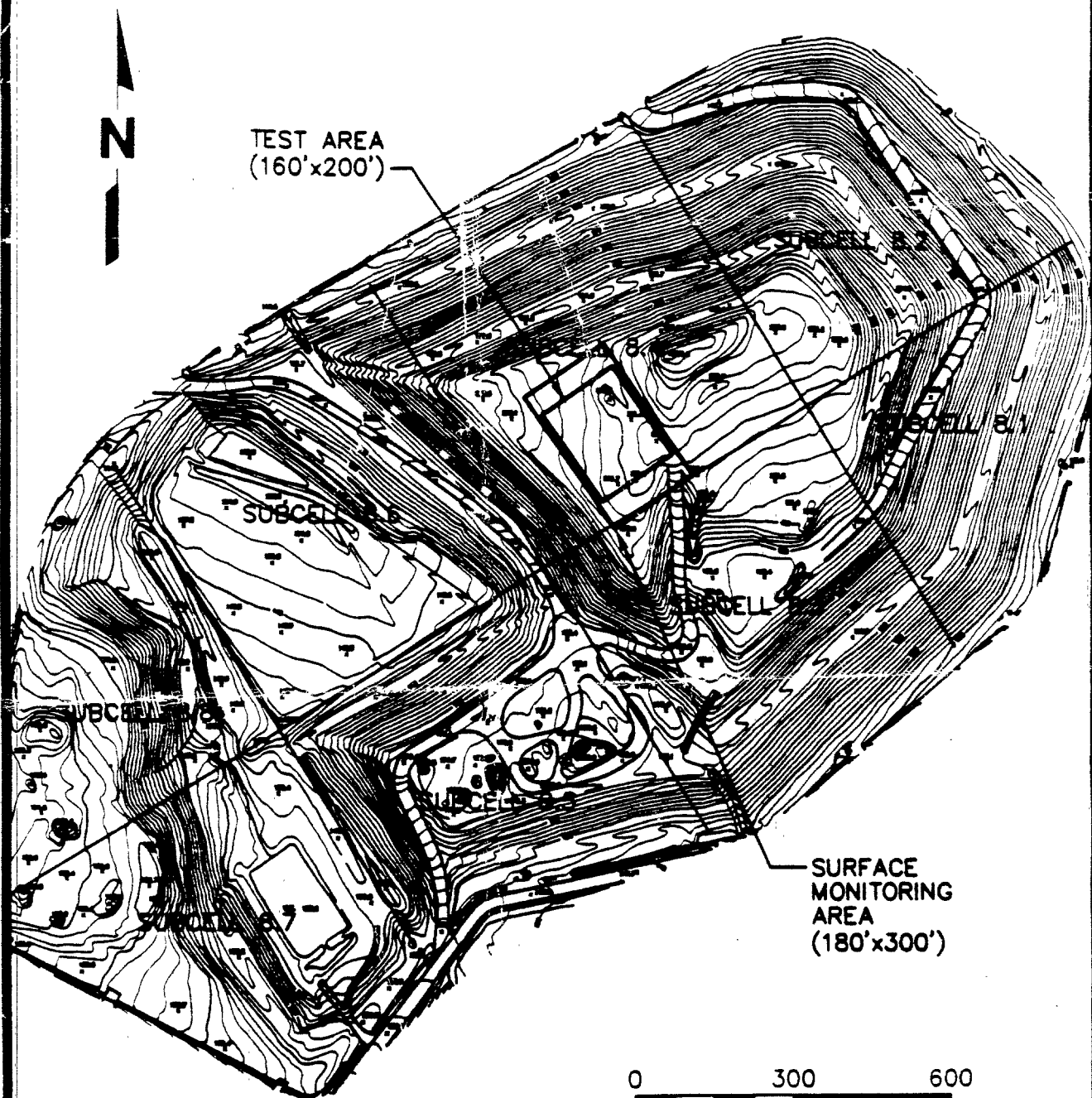


# ANNE ARUNDEL COUNTY MILLERSVILLE LANDFILL AND RESOURCE RECOVERY FACILITY

March 2000



DRAWN BY: RJS DATE: 9-20-00 FILE NAME: 02197054.03/SITE14



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SCALE IN FEET

**BIOREACTOR PILOT PROJECT  
SURFACE MONITORING AREA  
MILLERSVILLE LANDFILL - CELL 8**

SCS ENGINEERS